

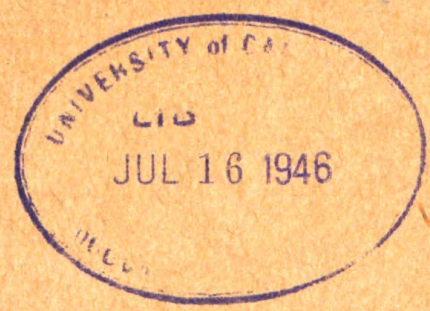
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WAR DEPARTMENT TECHNICAL MANUAL

U.S. Dept. of Army

LESSON PLANS ON PRACTICAL FIREMANSHIP



WAR DEPARTMENT • APRIL 1946

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T M 5-693

LESSON PLANS
ON
PRACTICAL
FIREMANSHIP

WAR DEPARTMENT • APRIL 1946

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FOREWORD

These lesson plans are intended only for the use of instructor-inspectors and fire chiefs, or assistant fire chiefs at Army installations in continental United States, who have reference material for use in applying the lesson plans. Pending the expansion of the manual to include material now contained in Oklahoma A & M Fire Service Training Manuals, copies of these may be obtained from the Department of Trade and Industrial Education, Oklahoma A & M College, Stillwater, Oklahoma, for reference purposes.

This series of lesson plans covers the basic phases of firemanship. Additional lesson plans covering other phases of firemanship will be prepared as soon as the effect and results of the application of first lesson plans can be determined. The manual will then be revised to perfect teaching techniques to include the complete courses, as well as the Training Manual material referred to above.

The WD AGO forms in the "R" series in this manual may be reproduced locally by spirit or mimeograph duplicating process. The number, title, and date will appear on all reproductions.

SECTION I

INTRODUCTION

1. Purpose and Scope

This Technical Manual is a guide to personnel who train post fire fighters. It consists of a series of lesson plans covering each phase of firemanship, and a brief explanation of how to use the plans.

2. Training Objective

Because of the emergency nature of fire-fighting and rescue operations, fire fighters must be able to perform any required task swiftly, efficiently, and *automatically*. In addition, they must remain calm and efficient despite the confusion normally accompanying a fire. Instruction must therefore include constant practice and drills in all fire-fighting evolutions. A complete training program must—

a. Teach each individual to perform all the jobs required of a fire fighter.

b. Train all individuals in a fire-fighting company to function smoothly and efficiently as a unit.

c. Equip each fire fighter for promotion to the next higher grade by giving him training in fire-fighting tactics, fire-department administration, and duties of a fire officer.

d. Train fire fighters for special assignments, such as fire inspectors and instructors.

3. Using Lesson Plans

Lesson plans in this manual are designed to standardize fire-fighter training at Army posts and to improve the quality of instruction. However, they are merely outlines and instructors must supplement them by study of reference material indicated in each lesson, and by personal experience. The lesson plans need not be followed absolutely; instructors can modify them to fit post training needs and the learning level of post fire fighters. Use can be made of the lesson plans to train all personnel on the post in the rudiments of fire conception, propagation and control measures. The general suggestions below will help instructors make best use of the lesson plans.

a. INSTRUCTION. Getting the students' interest is one of the most important steps in teaching. Therefore, plan the introduction to each lesson carefully. Whenever possible, use an actual incident to illustrate the reason for the lesson and arouse the attention of the class. Always show students how the lesson applies to their work and how it relates to material previously studied. Vary the technique of introduction to avoid dullness. Be brief.

b. DISCUSSION. Use demonstrations, charts, pictures, and other training aids as much as possible during the actual presentation of the

lesson. Enlist class participation by asking questions, presenting hypothetical problems, and encouraging students to raise questions of their own.

Note. The Oklahoma A & M Fire Service Training Manual Series is used as a reference source for these lesson plans. This series consists of the following 11 units:

- Unit I. Forcible Entry and Minor Extinguishment Practices.
- Unit II. Ladder Practices.
- Unit III. Hose Practices.
- Unit IV. Salvage and Overhaul Practices.
- Unit V. Fire Stream Practices.
- Unit VI. Fire Apparatus Practices.
- Unit VII. Ventilation Practices.
- Unit VIII. Rescue Practices.
- Unit IX. First-Aid Practices.
- Unit X. Inspection Practices.
- Unit XI. Fire Fighting Practice.

Additional recognized texts and other state fire school material could also be utilized for modification and preparation of these lessons.

c. **PRACTICAL WORK.** A period of practical work, during which the class puts into practice material covered in the lesson, helps the student retain what he has learned. Supervise practical work closely. Correct any mistakes made immediately, using the correction to clear up doubtful points for the entire class. Plan practical work periods so every student participates.

d. **TEST.** Tests show how much each student has learned and, equally important, show what points need review and what students need special help. If a number of students answer any question incorrectly, assume that instruction on that point was inadequate and repeat that part of the lesson. Sample check lists are included with most of the lesson plans to help instructors grade their classes.

e. **SUMMARY.** As the last step in the lesson, review key points briefly to make sure the class understands them clearly.

f. **FOLLOW-UP.** Observe the men closely during drills and actual fire-fighting operations to see whether they are applying material learned in the class. If any deficiencies are noted, repeat the instruction on these points at the next lesson.

SECTION II

LESSON PLANS

Subject No. 1. First-aid Fire-fighting appliances

LESSON No. 1. Types and uses of first-aid fire-fighting appliances.

OBJECTIVE. To teach the construction, operation and use of first-aid fire-fighting appliances.

EQUIPMENT AND TRAINING AIDS. Extinguisher charts, Navy Films Nos. MN 61A and MN 61B, Chemistry of Fire; extinguishers: pump-tank type, soda-acid type, foam type, vaporizing-liquid type, carbon dioxide type, dry-powder type, wheeled types, and miscellaneous types.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-687 (Inspection and Preventive Maintenance Services for Fire-Protection Equipment and Appliances); TM 5-692 (Fire Department Techniques).

TIME REQUIRED. Two hours plus time needed to show film.

PRESENTATION.

I. INTRODUCTION. Definition of first-aid fire fighting. Importance of first-aid fire-fighting appliances in fire protection and prevention. Value of this information at home as well as on the job.

II. DISCUSSION.

a. Principles of combustion:

- (1) Factors necessary for a fire to start: fuel, oxygen, and heat.
- (2) Conditions under which these factors must be combined; the fire triangle.

b. Types of fire; Underwriters' classification and its purpose:

- (1) Class A fire.
- (2) Class B fire.
- (3) Class C fire.

c. Methods of extinguishing fires; breaking the combustion combination (fire triangle):

- (1) Cooling.
- (2) Shutting out oxygen.
- (3) Removing fuel.

d. Classification of first-aid fire extinguishers; Underwriters' Laboratories units and class:

- (1) Class A extinguishers.
- (2) Class B extinguishers.
- (3) Class C extinguishers.

e. Types of first-aid fire appliances:

- (1) Pump-tank.
- (2) Soda-acid.
- (3) Foam.
- (4) Vaporizing-liquid.
- (5) Carbon dioxide.

- (6) Dry-powder.
- (7) Wheeled extinguishers.
- (8) Miscellaneous types.
- f. Limitations of first-aid extinguishers:
 - (1) Size of fire.
 - (2) Material burning.
 - (3) Intensity of heat produced.
 - (4) Situations in which various types of extinguishers may be combined.
- g. Precautions:
 - (1) Importance of notifying fire department first.
 - (2) Need for protection against harmful gases produced by extinguishing agent.
 - (3) Need for supplementing extinguishers with additional water supply.
 - (a) Pails and buckets.
 - (b) Garden hose.

III. PRACTICAL WORK. Conduct a class conference to fill in the following form:

FIRST-AID FIRE-FIGHTING APPLIANCES

Types	Pump-tank	Soda-acid	Foam	Carbon tetrachloride	Carbon dioxide
Sizes					
Extinguishing method					
Extinguishing agent					
Conductor of electricity					
Effect on class A fires					
Effect on class B fires					
Effect on class C fires					
Precautions					

WD AGO Form R-5356, 1 April 46.

- IV. TEST.
 - a. Question each student on types and uses of fire extinguishers.
 - b. Grade students on use of each type of extinguisher at demonstration area.
- V. SUMMARY.
 - a. Importance of knowing what to expect of an extinguisher.
 - b. Hazards involved in using wrong type of extinguisher.
 - c. Personal protection.

Subject No. 1. First-aid Fire-fighting Appliances

LESSON No. 2. Pump-tank fire extinguisher.

OBJECTIVE. To develop the ability to use a pump-tank extinguisher efficiently.

EQUIPMENT AND TRAINING AIDS. Pump-tank charts; hand-

carry and back-pack pump-tank extinguishers; pail; supply of water; antifreeze compound; materials for class A and class B fires.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-687 and 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Value of pump-tank extinguishers in fighting fires.

II. DISCUSSION.

a. Types of pump tank extinguishers:

- (1) Hand-carry type.
- (2) Back-pack type.
 - (a) Trombone type.
 - (b) Tank pump.

b. Sizes:

- (1) 5-gallon.
- (2) 4-gallon.
- (3) 2½-gallon.

c. Filling tank:

- (1) Material used.
- (2) Antifreeze protection.
 - (a) Proper mixing of solution.
 - (b) Dangers of improper mixture.

d. Operating extinguisher:

- (1) Back-pack extinguisher.
 - (a) Trombone type.
 - (b) Tank-pump type.
- (2) Hand-carry extinguishers.
 - (a) Carrying methods.
 - (b) One-man operation.
 - (c) Two-man operation.
- (3) Applying the stream; spray or straight.
- (4) Refilling; continued operation.

e. Maintenance:

- (1) Washing parts when refilling.
- (2) Keeping hose and nozzle open.
- (3) Oiling pump rod frequently.
- (4) Testing by pumping water back into can.
- (5) Using antifreeze when necessary.
- (6) Inspection.

f. Precautions:

- (1) When pump-tank extinguishers cannot be used.
- (2) Range of stream.
- (3) Limit of water supply.
- (4) Importance of using correct antifreeze.

III. PRACTICAL WORK. Divide class into groups under competent leaders and—

a. Have each student carry and operate each type of pump-tank extinguisher.

b. Have groups disassemble, clean, and reassemble pumps and fill them ready for use.

IV. TEST.

a. Start a class A fire. Assign problem of extinguishing fire to groups of three men and observe operations.

b. Start a class B fire and get volunteers to put it out.

c. Provide hindrances, such as clogging the nozzle, and check students' ability to locate and correct difficulty.

d. Using the check list, grade each student on his knowledge of pump-tank extinguishers.

PUMP TANK EXTINGUISHERS

Student	Hand-carry type			Back-pack type		
	Carry	Operation	Recharging	Carry	Operation	Recharging

WD AGO Form R-5357, 1 April 46.

V. SUMMARY.

a. Importance of correctly evaluating fires.

b. Limitations of pump-tank extinguishers.

c. Value of using more than one extinguisher at a fire.

Subject No. 1. First-aid Fire-fighting Appliances

LESSON No. 3. Soda-acid fire extinguisher.

OBJECTIVE. To develop the ability to use a soda-acid fire extinguisher efficiently.

EQUIPMENT AND TRAINING AIDS. Soda-acid extinguisher charts; soda-acid extinguishers: break-bottle type, lead-stopper type, 2½-gallon type, and 40-gallon wheeled type; recharges; pail, supply of water; materials for class A and class B fires.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I, TM 5-687 and 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Value of soda-acid extinguishers in fire fighting.

II. DISCUSSION.

a. Types of soda-acid extinguishers:

(1) Break-bottle type.

(2) Lead-stopper dump type.

b. Sizes:

(1) 2½-gallon.

(2) 40-gallon.

c. Chemistry:

(1) Materials used: bicarbonate of soda, sulfuric acid, and water.

(2) Function of carbon dioxide which is generated.

(3) Function of water.

d. Charging extinguisher:

(1) Frequency.

(2) Preparing the charge.

(3) Placing charge in extinguisher.

(4) Final check before replacing in service.

- (5) Tagging extinguisher.
- e. Operating extinguisher:
 - (1) Carrying method.
 - (2) Setting off extinguisher.
 - (a) Break-bottle type.
 - (b) Lead-stopper type.
 - (3) Applying stream to fire.
 - Effective range.
 - (4) Use of more than one extinguisher on a fire.
- f. Maintenance:
 - (1) Washing and recharging.
 - (2) Care of hose, nozzle, and gaskets.
 - (3) Preventing tank corrosion.
 - (4) Storing extinguishers.
 - (5) Protecting against freezing.
- g. Inspection:
 - (1) Condition and level of charge.
 - (2) Completeness of label.
 - (3) Condition of hose and nozzle.
 - (4) Condition of tank.
 - (5) Condition of seal (if used).
- h. Precautions:
 - (1) When soda-acid extinguishers cannot be used.
 - (2) Life of charge.
 - (3) Proper reassembly and parts replacement.

III. PRACTICAL WORK. Divide class into groups under competent leaders.

- a. Have each student grasp, carry, and operate a soda-acid extinguisher.
- b. Have each student wash and recharge an extinguisher.

IV. TEST.

- a. Start a class A fire, assign problem of extinguishing it to three-man groups.
- b. Repeat above test with a class B fire.
- c. Using the check list, grade each student on his knowledge of soda-acid extinguishers.

SODA-ACID EXTINGUISHERS

Student	2½-gallon			40-gallon		
	Carry	Operation	Recharging	Handling	Operation	Recharging

WD AGO Form R-5358, 1 April 1946.

V. SUMMARY.

- a. Importance of correctly evaluating fire.
- b. Limitations of soda-acid extinguishers.
- c. Value of using more than one extinguisher at a fire.
- d. Proper methods of handling extinguisher and hose to prevent damage.

- e. Correct charging procedure.
- f. Advantages of prepared charges.
- g. Possible break-downs and methods of avoiding them.

Subject No. 1. First-aid Fire-fighting Appliances

LESSON No. 4. Foam-type fire extinguisher.

OBJECTIVE. To develop the ability to use a foam-type fire extinguisher efficiently.

EQUIPMENT AND TRAINING AIDS. Foam-type extinguisher charts; extinguishers: dump type, fire-department type, wheeled type, conversion unit; recharges; pails; supply of water; materials for class A and class B fires.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-687 and 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Value of foam-type extinguisher in fighting fires.

II. DISCUSSION.

a. Types of foam extinguishers:

- (1) Dump type.
- (2) Fire department type.
- (3) Wheeled type.
- (4) Conversion unit: pump tank, mechanical foam, and special nozzle.

b. Sizes:

- (1) 2½-gallon.
- (2) 4-gallon.
- (3) 40-gallon.

c. Chemistry:

- (1) Materials used: A charge, B charge, and water.
- (2) Function of carbon dioxide gas.
- (3) Nature of foam and its effect on fires.

d. Charging extinguisher.

- (1) Frequency:
- (2) Preparing charge.
- (3) Placing charge in extinguisher.
- (4) Final check before replacing in service.

e. Operating extinguisher:

- (1) Carrying method.
- (2) Setting off extinguisher.
- (3) Applying stream to fire.
 - (a) Effective range.
 - (b) Time required to empty each size extinguisher.
- (4) Use of more than one extinguisher on a fire.

f. Maintenance:

- (1) Washing and recharging.
- (2) Preserving hose, nozzle, and gaskets.
- (3) Preventing tank corrosion.
- (4) Storing.
- (5) Protecting against freezing.
- (6) Victory model. (See TM 5-687.)

g. Inspection:

- (1) Completeness of label.
- (2) Condition and level of charge.
- (3) Condition of hose, nozzle, and gaskets.
- (4) Condition of tank.
- (5) Condition of seal (if used).

h. Precaution:

- (1) Limitations on use.
- (2) Life of charge.

III. PRACTICAL WORK. Divide class into three-man groups under competent leaders and—

a. Have each student grasp, carry, and operate each type of foam extinguisher.

b. Have each student clean and recharge an extinguisher.

IV. TEST.

a. Start a class A fire and assign problem of putting it out to a three-man group.

b. Start a class B fire and repeat above test.

c. Using the check list, grade each student on his knowledge of foam-type extinguishers.

FOAM-TYPE EXTINGUISHERS

Student	2½-gallon			40-gallon			4-gallon		
	Carry	Operation	Re-charging	Handling	Operation	Re-charging	Carry	Operation	Re-charging

WD AGO Form R-5359, 1 April 1946.

V. SUMMARY.

a. Value of foam as an insulating and extinguishing agent.

b. Capabilities and limitations of each type of foam extinguisher.

Subject No. 1. First-aid Fire-fighting Appliances

LESSON No. 5. Carbon tetrachloride fire extinguisher.

OBJECTIVE. To develop the ability to use a carbon tetrachloride fire extinguisher efficiently.

EQUIPMENT AND TRAINING AIDS. Carbon tetrachloride ex-

tinguisher charts; hand-pump and stored-pressure types of carbon tetrachloride extinguishers; supply of carbon tetrachloride; material for class A and class B fires.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-687 and 5-692.

TIME REQUIRED. Two hours

PRESENTATION.

I. INTRODUCTION. Value of carbon tetrachloride extinguishers in fighting fires.

II. DISCUSSION.

a. Types of carbon tetrachloride extinguishers:

(1) Hand-pump type: description and size.

(2) Stored-pressure type with pump: description and size.

b. Carbon tetrachloride:

(1) Characteristics.

(a) Vapor density heavier than air.

(b) Does not support combustion.

(c) Nonconductor of electricity.

(d) Vaporizes readily.

(2) Effect on fire.

c. Charging extinguisher:

(1) Hand-pump type.

(2) Stored-pressure type.

(3) Precautions.

(a) Preventing corrosion.

(b) Excluding moisture.

(c) Filling to mark.

(d) Using specified liquid only.

d. Operating extinguisher:

(1) Hand-pump type.

(a) Removing from hanger.

(b) Releasing pump handle.

(c) Pumping.

(d) Applying stream to fire

1. Effective range.

2. Time required to empty extinguisher.

(2) Stored-pressure type.

(a) Carrying method.

(b) Applying stream to fire

1. Effective range.

2. Time required to empty extinguisher.

e. Maintenance:

(1) Preventing hose deterioration.

(2) Cleaning nozzle and vent

(3) Preventing corrosion of tank and pump-handle rod.

- (4) Replacing washers.
- (5) Recharging.
- f. Inspection:
 - (1) Completeness of label.
 - (2) Condition and level of charge.
 - (3) Condition of tank, nozzle, and vent.
 - (4) Condition of seal.
- g. Precautions:
 - (1) Use in closed places; danger of phosgene gas.
 - (2) Care in recharging.
 - (3) Limitations on use.
 - (4) Life of charge.

III. PRACTICAL WORK.

a. Divide class into small groups under competent leaders and have each student grasp, carry, and operate each type of carbon tetrachloride extinguisher.

b. Use extinguisher on class A fire to demonstrate why it is not satisfactory for this type.

IV. TEST.

a. Start class B fire, assign problem of extinguishing it to a small group, and observe operations.

b. Use check list to test each student's knowledge of carbon tetrachloride extinguishers.

CARBON TETRACHLORIDE EXTINGUISHERS

Student	Hand-pump type			Stored-pressure type		
	Carry	Operation	Recharging	Carry	Operation	Recharging

WD AGO Form R-5360, 1 April 1946.

V. SUMMARY.

a. Capabilities and limitations of carbon tetrachloride extinguishers; practicability on fires in electrical equipment.

b. Importance of directing stream properly.

c. Need for personal protection when using extinguisher in closed place.

Subject No. 1. First-aid Fire-fighting Appliances

LESSON No. 6. Carbon dioxide fire extinguisher.

OBJECTIVE. To develop the ability to use a carbon dioxide fire extinguisher efficiently.

EQUIPMENT AND TRAINING AIDS. Carbon dioxide extinguisher

charts; hand and wheeled type carbon dioxide fire extinguishers; materials for class A and class B fires.
REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-687 and 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Value of carbon dioxide extinguisher in fighting fires.

II. DISCUSSION.

a. Types of carbon dioxide extinguishers:

(1) Hand type: description and sizes.

(2) Wheeled type: description and size.

b. Characteristics of carbon dioxide:

(1) Density $1\frac{1}{2}$ times as heavy as air.

(2) Nonconductor of electricity.

c. Charging extinguisher:

(1) With larger cylinder.

(2) With dry-ice conversion unit.

(3) Weighing cylinders.

(4) Precautions.

(a) Guarding against moisture.

(b) Keeping extinguisher away from heat and direct rays of sun.

(c) Making sure valve and disk seat properly.

(d) Filling to correct weight.

(e) Operating extinguishers.

(1) Hand type.

(a) Method of carrying.

(b) Setting off extinguisher.

(2) Wheeled type.

(a) Wheeling extinguisher to fire.

(b) Setting off extinguisher.

(c) Applying extinguishing agent to fire.

1. Effective range.

2. Time needed to empty extinguisher.

e. Maintenance:

(1) Preventing hose deterioration.

(2) Cleaning valve openings.

(3) Cleaning nozzle or orifice.

(4) Replacing disk.

(5) Replacing complete valve.

(a) Type.

(b) Tightness.

(c) Care of brass threads.

(d) Safety-disk operation.

f. Inspection:

- (1) Completeness of label.
- (2) Weight of extinguisher.
- (3) Condition of hose and nozzle.
- (4) Condition of valve.
- (5) Condition of seal.
- (6) Leaks.

g. Precautions:

- (1) Limitations on use.
- (2) Life of charge.
- (3) Backflash.

III. PRACTICAL WORK.

a. Divide class into small groups under competent leaders and have each student grasp, carry, and operate each type of carbon dioxide extinguisher.

b. If materials permit, conduct experiments on practicability of carbon dioxide as an extinguishing agent; determine its limitations.

IV. TEST.

a. Start class B fire. Assign the problem of extinguishing it to a small group and observe operations.

b. Give an oral quiz, using questions that bring out the technique for each operation.

c. Question students on the chemical reaction produced in extinguishing a fire with carbon dioxide.

d. Using check sheet, grade each student on his knowledge of carbon dioxide extinguishers.

CARBON DIOXIDE EXTINGUISHERS

Student	Hand type			Wheeled type		
	Carry	Operation	Recharging	Carry	Operation	Recharging

WD AGO Form R-5361, 1 April 1946

V. SUMMARY.

a. Capabilities and limitations of carbon dioxide extinguishers.

b. Hazards involved in their use.

c. Skills needed for efficient operation.

Subject No. 2. Forcible Entry

LESSON No. 1. Making forcible entry.

OBJECTIVE. To teach quick, safe methods of making a forcible entry with least possible damage to a building and with maximum personal safety.

EQUIPMENT AND TRAINING AIDS. Charts illustrating problems in forcible entry; cutting, striking, sawing, battering, prying, pulling, burning, and miscellaneous tools.

REFERENCE. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. **INTRODUCTION.** Definition of forcible entry. Its importance in fire fighting.

II. **DISCUSSION.**

a. When forcible entry is necessary to—

- (1) Reach a fire.
- (2) Make a rescue.
- (3) Ventilate a fire.
- (4) Advance hose lines.
- (5) Keep fire from rekindling.

b. Methods of forcible entry:

- (1) Opening doors.
- (2) Opening windows.
- (3) Breaking glass.
- (4) Opening partitions.
- (5) Opening ceilings.
- (6) Opening floors.
- (7) Breaching sidewalks.
- (8) Breaching walls.
- (9) Opening roofs.

c. Tools used:

- (1) Cutting tools.
- (2) Striking tools.
- (3) Sawing tools.
- (4) Battering tools.
- (5) Prying tools.
- (6) Pulling tools.
- (7) Burning tools.
- (8) Miscellaneous tools.

d. Sizing up situation; determining—

- (1) Need for forcible entry.
- (2) Place of entry.
- (3) Method of entry.
- (4) Tools needed.

e. Precautions:

- (1) Avoiding unnecessary damage to building.
- (2) Personal safety.
- (3) Readiness of hose lines.

III. TEST.

- a.** What does forcible entry mean?
- b.** What value does it have in fire fighting?
- c.** Describe situations that would require forcible entry in case of fire or accident.
- d.** What factors are considered in determining where, when, and how to open buildings?

IV. SUMMARY.

- a.** Factors to be considered in making forcible entry: speed, safety, and limiting damage to property.
- b.** Skills required for efficient operation.
- c.** Importance of thorough training and frequent practice.
- d.** Effect of careless or improper forcible entry on public relations.

Subject No. 2. Forcible Entry

LESSON No. 2. Using a fireman's ax.

OBJECTIVE. To develop an understanding of the construction, care, and use of the pick-headed ax and the ability to use it safely.

EQUIPMENT AND TRAINING AIDS. Fireman's pick-headed ax; cutting material such as block, box, and boards; window glass; if possible an old building.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. General description and uses of the fireman's ax.

II. DISCUSSION.

a. Construction of ax:

(1) Axhead.

(a) Body.

1. Thickness.
2. Weight.

(b) Blade.

1. Shape.
2. Thickness.
3. Edge.
4. Temper.

(c) Pick.

1. Purpose.
2. Shape.
3. Temper.
4. Point.

- (2) Handle.
 - (a) Material.
 - (b) Shape.
 - 1. Shoulder.
 - 2. Grip.
 - (c) Finish.
- b. Using ax:
 - (1) General suggestions.
 - (a) Learn to cut right- or left-handed.
 - (b) Cut as close to self as possible.
 - (c) Sound, to locate joists.
 - (d) Use short strokes only.
 - (2) Cutting with ax.
 - (a) Position of hands.
 - (b) Stroke.
 - (c) Relation to grain of wood.
 - (d) Relation to surface.
 - (e) Relation to joists.
 - (3) Prying with ax.
 - (a) Inserting pick.
 - (b) Direction of pry.
 - (c) Leverage.
 - (4) Breaking glass.
 - (a) Position of hands.
 - (b) Position of body.
 - (c) Position of ax.
- c. Carrying ax, on ground and climbing ladder.
 - (1) In belt.
 - (2) In hand.
 - (3) Under arm.
- d. Maintenance:
 - (1) Keeping ax clean.
 - (2) Keeping wedge tight.
 - (3) Keeping handle smooth.
 - (4) Keeping point and blade sharp.
- e. Precautions.
 - (1) Personal protection.
 - (2) Safe cutting practices.
 - (3) Protecting others.

III. PRACTICAL WORK. Have each student use ax to chop, break glass, and open doors, windows, and flooring.

IV. TEST.

- a. Have each student demonstrate proper use of ax.
- b. Check each student on picking up and carrying an ax.
- c. Question class on proper care of an ax, names of parts, and uses.

V. SUMMARY.

- a. Uses of the fireman's ax.**
- b. Safety precautions.**

Subject No. 2. Forcible Entry

LESSON No. 3. Breaking glass.

OBJECTIVE. To develop the ability to break and remove glass quickly, safely, and with a minimum of property damage.

EQUIPMENT AND TRAINING AIDS. Drawings of commercial and artistic windows; glass; fireman's ax; pike pole; ball and chain; fireman's helmet; sledge; maul; other tools used to break glass.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of knowing how to break glass with greatest personal safety and least possible property damage.

II. DISCUSSION.

a. Types of glass:

- (1) Single-, double-, and triple-strength windowpane glass.
- (2) Wired glass.
- (3) Plate glass.
- (4) Safety glass.
- (5) Plastics.
- (6) Art glass.
- (7) Glass block.
- (8) Miscellaneous.

b. Tools:

- (1) Fireman's ax.
- (2) Fireman's helmet.
- (3) Ladder.
- (4) Pike pole.
- (5) Ball and chain.
- (6) Sledge or maul.
- (7) Other tools.

c. Breaking glass:

- (1) Location in building.
 - (a) Ground level.
 - (b) Upper floor.
 - (c) From above.
- (2) Fireman's position.
- (3) Tools.

d. Removing broken glass from frame:

- (1) Importance.
- (2) Method.

e. Sizing up situation:

- (1) Purpose of breaking glass.
- (2) Location in building.
 - (a) Exposures endangered.
 - (b) Ground level or upper floor.
- (3) Type of glass.
- (4) Size of pane.
- (5) How fastened.
- (6) Comparative value.

f. Precautions; danger from—

- (1) Flying glass.
- (2) Sliding glass.
- (3) Fragments left in frame.

III. PRACTICAL WORK. Divide class into small groups under competent leaders and—

a. Designate a window or door having a glass to be broken, state purpose for breaking, and have each student describe how he would break it.

b. Have students go through operation up to the point of smashing glass, both on the ground and from a ladder.

IV. TEST.

a. Have students break glass, giving reasons for each step.

b. Present problems which bring out the comparative value of breaking glass and forcing doors and windows.

c. Test students' judgment in sizing up a situation; include problems involving more common situations which firemen must evaluate.

V. SUMMARY.

a. When glass should be broken; danger of spreading fire by breaking glass too freely.

b. Safety precautions.

c. Economic comparisons.

Subject No. 2. Forcible Entry

LESSON No. 4. Opening windows.

OBJECTIVE. To develop the ability to open windows efficiently in emergency.

EQUIPMENT AND TRAINING AIDS. Fireman's ax; door opener; pike pole; models of windows; samples of fastening devices; sketches or pictures showing methods of fastening.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Purpose of opening windows in fighting fires.

II. DISCUSSION.

a. Component parts of windows: Pane, sash, frame, sill, jamb, rail stop.

b. Types of windows; method of hanging; operation:

- (1) Check-rail type.
- (2) Wood or metal casement type.
- (3) Wood or metal basement type.
- (4) Factory type.

c. Methods of fastening windows:

- (1) Check-rail window.
 - (a) Locking sash together.
 - (b) Locking sash in frame.
- (2) Casement window.
 - (a) Locking to frame.
 - (b) Locking together.
 - (c) Locking with adjusting device.
- (3) Basement window; locking to frame.
- (4) Factory window; locking to frame.

d. Methods of opening windows:

- (1) Check-rail type.
 - (a) Prying, or lowering sash to remove locking device.
 - (b) Breaking glass to reach locking device.
- (2) Casement window.
 - (a) Prying to remove locking device.
 - (b) Spreading frame.
- (3) Basement window; breaking glass to reach locking device.
- (4) Factory window; breaking pane of glass nearest lock to reach locking device.
- (5) Opening with pike pole from above.

e. Tools:

- (1) Fireman's ax.
- (2) Crowbar.
- (3) Pike pole.

f. Sizing up situation:

- (1) Type of window.
- (2) Method of hanging.
- (3) Method of fastening.
- (4) Correct tool for opening.

III. PRACTICAL WORK.

a. Divide class into small groups under competent leaders. Have each student study a window, select the proper tool, place it in position, and explain how he would open the window. Repeat with each type of window available.

b. Take class on a tour; point out different type windows, and call for suggestions on how to open each type. Hold class conference on procedures suggested.

IV. TEST. Have each student demonstrate how he would open a window, and then explain why he chose the procedure which he used.

V. SUMMARY.

- a. Types of windows and names of their component parts.
- b. Responsibility for keeping property damage to a minimum.
- c. Importance of quick, safe operations.
- d. Safety precautions.
- e. Importance of knowing where to open.

Subject No. 2. Forcible Entry

LESSON No. 5. Opening doors.

OBJECTIVE. To develop the ability to open doors efficiently in emergency.

EQUIPMENT AND TRAINING AIDS. Ax; crowbar; door opener; Kelly tool; models of doors; sample of door locks and fasteners; pictures of doors which are not available.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Purpose of opening doors when fighting fires.

II. DISCUSSION.

a. Types of doors:

(1) Wood.

(a) Slab.

(b) Panel.

1. Wood.

2. Glass.

(c) Batten.

(2) Metal.

(a) Solid.

(b) Corrugated.

(c) Metal-covered.

(d) Panel.

(e) Rolling.

(3) Glass and plastic.

b. Methods of hanging doors:

(1) Hinged.

(a) Direction of swing: in or out.

(b) Type of jamb: stopped or rabbeted.

(2) Sliding.

(3) Overhead.

(a) Sliding.

(b) Rolling.

(4) Revolving.

c. Methods of locking doors:

- (1) Padlock.
- (2) Keyed lock.
 - (a) Rim.
 - (b) Mortised.
 - (c) Snap.

- (3) Bolts.
- (4) Bars.
- (5) Special locks.

d. Methods of opening doors:

- (1) Normal way.
- (2) Removing panel.
- (3) Spreading frame.
- (4) Removing hasp.
- (5) Breaching wall.
- (6) Cutting with torch.
- (7) Springing bolt by prying.
- (8) Breaking locking device.

e. Tools:

- (1) Fireman's ax.
- (2) Lever type door opener.
- (3) Kelly tool.

f. Sizing up situation:

- (1) Door construction.
- (2) Method of hanging.
- (3) Method of locking.
- (4) Correct tool for opening.

III. PRACTICAL WORK. Divide class into small groups under competent leaders. Have each student study a door, select the proper tool, place it in position, and explain how he would open the door. Repeat with different types of doors.

IV. TEST. Have each student demonstrate how he would open a door, and then explain why he chose the procedure which he used.

V. SUMMARY.

- a. Types of doors and names of their component parts.
- b. Responsibility for keeping property damage to a minimum.
- c. Importance of quick, safe operations.
- d. Safety precautions.

Subject No. 2. Forcible Entry

LESSON No. 6. Opening floors.

OBJECTIVE. To develop the ability to open floors efficiently in emergency.

EQUIPMENT AND TRAINING AIDS. Ax, floor saw, sledge, chisel, battering ram, crowbar, claw tool, and miscellaneous tools; sample of flooring; diagrams of types of floors.

REFERENCES. Oklahoma A & M Fire Service Training Manual,
Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Purpose of opening floors in fire fighting.

II. DISCUSSION.

a. Types of floors:

(1) Wood floor.

(a) Single floor.

(b) Double floor.

(c) Wood joist.

(d) Fire-resistant joists or base.

(2) Tile floor; on—

(a) Wood subfloor and wood joists.

(b) Concrete.

(3) Composition floor: asphalt tile, linoleum, etc., on—

(a) Wood subfloor and wood joists.

(b) Concrete.

(4) Terazzo on concrete.

(5) Concrete.

b. Methods of opening floors:

(1) Wood floor.

(a) Cutting top floor.

(b) Cutting subfloor.

(c) Removing boards.

(2) Tile and composition on wood subfloor and wood joists.

(a) Removing cover.

(b) Cutting subfloor.

(3) Concrete and concrete-base floors.

(a) Breaching.

(b) Cutting the reinforcing.

c. Tools:

(1) Ax.

(2) Floor saw.

(3) Sledge.

(4) Chisel.

(5) Battering ram.

(6) Crowbar.

(7) Claw tool.

(8) Power tools.

d. Sizing up situation:

(1) Purpose of making opening.

(2) Determining place to open.

(a) Hot spot.

(b) Drainage.

(3) Sounding to determine type of base.

(4) Finding direction and location of joists.

(5) Selecting correct tools.

e. Precautions:

(1) Use correct chopping position.

(2) Test condition of floor if there is a fire below.

(3) Avoid cutting floor in path used by other firemen.

III. PRACTICAL WORK.

a. Have each student select a tool and simulate opening a floor, explaining each step. Repeat for various types of floors.

b. Have each student demonstrate use of floor saw.

c. Have each student demonstrate method of breaching with battering ram and with sledge and point of chisel.

d. If practice floor is available, demonstrate complete procedure of opening a floor.

IV. TEST.

a. Give each learner a problem involving opening a floor, giving type and purpose of opening. Have him select tools and explain procedure.

b. Have students identify all types of floors available and state all information needed to determine fire-fighting procedure.

c. Designate floors in specific building locations and ask each student to get all information needed for planning floor-opening procedure and to submit a report at the next class.

V. SUMMARY.

a. Importance of knowing all types of floors.

b. Floor-opening procedure.

Subject No. 2. Forcible Entry

LESSON No. 7. Opening ceilings, walls, and partitions.

OBJECTIVE. To develop the ability to open a wall, partition, or ceiling efficiently.

EQUIPMENT AND TRAINING AIDS. Pike pole, ax, floor saw, and miscellaneous tools; sketches showing ceiling construction; samples of composition ceiling materials; sketches showing partition construction; samples of covering material.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I, TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Why knowing how to open walls, partitions, and ceilings is important in fire fighting.

II. DISCUSSION.

a. Types of ceilings:

(1) Construction:

(a) Wood lath and plaster.

(b) Metal lath and plaster.

- (c) Wood.
 - (d) Metal-covered.
 - (e) Composition: sheet rock, celotex, pressed wood, etc.
 - (f) Concrete.
- (2) Method of fastening.
 - (a) Nailed to ceiling joists.
 - 1. Lath nails.
 - 2. Staples
 - 3. Larger nails.
 - 4. Large-headed nails.
 - (b) Suspended with wires.
 - (c) Cemented.
 - (d) Miscellaneous.
- b. Types of partitions and walls:
 - (1) Wood studs covered with same materials as ceilings.
 - (2) Metal studs covered with metal lath and plaster.
 - (3) Masonry.
 - (a) Brick.
 - (b) Tile.
 - (c) Stone.
 - (d) Concrete blocks; poured concrete.
- c. Methods of opening:
 - (1) Ceiling.
 - (a) Pulling down covering.
 - (b) Chopping and sawing.
 - (2) Partitions.
 - (a) Pulling off covering.
 - (b) Chopping and sawing.
 - (c) Breaching.
- d. Tools:
 - (1) Pike pole.
 - (2) Ax.
 - (3) Floor saw.
 - (4) Battering ram.
- e. Sizing up situation:
 - (1) Reason for making opening.
 - (2) Material.
 - (3) Construction.
 - (4) Determining where to open.
 - (5) Selecting tool.
- f. Precautions:
 - (1) Personal safety.
 - (a) Pulling-down method.
 - (b) Condition of wall, partition, or ceiling.
 - (2) Sounding.

III. PRACTICAL WORK.

a. Demonstrate method of sounding a partition to determine construction and location of studs.

b. Have each student size up a partition or ceiling, select proper tool, place it in position, and explain how he would proceed to open.

IV. TEST. Have each student demonstrate how he would open a wall, partition, or ceiling, and then explain why he chose the procedure which he used.

V. SUMMARY.

a. Types of wall, partition, or ceiling construction.

b. Personal safety.

c. Importance of overhauling concealed spaces for traces of fire.

d. Need for feeling walls to determine hot spots.

Subject No. 2. Forcible Entry

LESSON No. 8. Opening roofs.

OBJECTIVE. To develop the ability to open roofs efficiently in emergency.

EQUIPMENT AND TRAINING AIDS. Fireman's ax, roof cutter, crowbar, claw tool, battering ram, sledge, and concrete chisel; sketches showing roof construction; samples of roofing material; model sections of roofs.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Why fire fighters must know how to open roofs.

II. DISCUSSION.

a. Types of roof construction.

(1) Wood sheathing covered with

(a) Wood shingles.

(b) Composition shingles.

(c) Roll roofing.

(d) Asbestos shingles.

(e) Slate shingles.

(f) Metal shingles.

(g) Tile.

(h) Tin plate.

(i) Tar and gravel.

(j) Other types.

(2) Concrete base.

(a) Plain.

(b) Covered with tar and gravel.

(3) Corrugated iron; on—

(a) Wood frame.

(b) Metal frame.

- b. Style of roof:
 - (1) Gabled.
 - (2) Hipped.
 - (3) Mansard.
 - (4) Flat.
- c. Methods of opening roofs:
 - (1) Removing skylight covering.
 - (2) Entering penthouse.
 - (3) Removing scuttle hole cover.
 - (4) Removing part of roofing.
- d. Tools:
 - (1) Fireman's ax.
 - (2) Roof cutter.
 - (3) Crowbar.
 - (4) Claw tool.
 - (5) Cutting torch.
 - (6) Battering ram.
 - (7) Sledge and chisel.
 - (8) Power equipment.
- e. Sizing up the situation:
 - (1) Purpose of opening.
 - (2) Construction.
 - (3) Determining place to make opening.
 - (4) Selecting tools.
- f. Precautions:
 - (1) Personal protection.
 - (2) Avoiding overhead obstruction.
 - (3) Opening ceiling below.

III. PRACTICAL WORK. Divide class into small groups under competent leaders and—

- a. Have each student select the tools and describe the method he would use to open a designated roof.
- b. Have each student practice using an ax as he would in an actual emergency.
- c. Have each student show how to use a roof cutter in opening a tin roof and a battering ram and chisel and sledge in opening a concrete roof.

IV. TEST.

- a. Have each student demonstrate method of opening a roof, explaining reasons for each step in the procedure.
- b. Arrange exercises on identification and use of tools; identification of styles of roofs; and types of roof construction.
- c. Prepare a problem on ventilation needs, rescue needs, etc., and ask for recommendations on where and how to open the roof.

V. SUMMARY.

- a.* Construction of roofs in vicinity.
- b.* Methods of opening roofs.
- c.* Where and how to open roofs.
- d.* Personal safety precautions.

Subject No. 3. Ropes and Rope Work

LESSON No. 1. Selecting, testing, and caring for ropes.

OBJECTIVE. To teach selection, testing, and care of ropes.

EQUIPMENT AND TRAINING AIDS. Samples of manila, sisal, hemp, and cotton rope.

REFERENCES. Oklahoma A & M Fire Service Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION:

I. INTRODUCTION. Importance of ropes and rigging to the fire fighter.

II. DISCUSSION.

a. Rope construction.

- (1) Fiber twisted into yarn.
- (2) Yarn twisted into strands.
- (3) Strands twisted into rope.
- (4) Number of strands.
- (5) Braided rope.

b. Materials.

- (1) Manila fiber.
 - (a) Source: Abaca (wild banana plant).
 - (b) Nature: hard and long.
- (2) Sisal fiber.
 - (a) Source: henequen palm.
 - (b) Nature: shorter than manila; hard.
- (3) Hemp fiber.
 - (a) Source: hemp plant.
 - (b) Nature: soft.
- (4) Cotton fiber.
 - (a) Source: cotton plant.
 - (b) Nature: very soft and short; deteriorates quickly.

c. Strength:

- (1) Determining factors.
 - (a) Length of fibers.
 - (b) Friction of fibers.
 - (c) Construction.
- (2) Comparison of rope materials.
 - (a) Manila.
 - (b) Sisal.
 - (c) Hemp.
 - (d) Cotton.
- (3) Effect of treatment with—
 - (a) Lubricants.
 - (b) Tar.
- (4) Relationship of strength to flexibility, softness, and sharp bends.

- (5) Effect of weathering.
- (6) Effect of knots.
- d. Testing rope:
 - (1) Inspection; check for—
 - (a) Cuts and chafing.
 - (b) Brittleness: bend rope to see if fibers are brittle.
 - (c) Dampness.
 - (d) Internal wear: open rope; fine powder indicates internal wear.
 - (2) Loading test.
 - (a) Hand lines, test—1½ times expected weight for 10 minutes.
 - (b) Rescue lines; test—2 times expected weight for 10 minutes.
 - (c) Significance of kind of rope.
- e. Maintenance:
 - (1) Protection against injury.
 - (2) Protection against weather.
 - (3) Protection against oils and acids.

III. PRACTICAL WORK.

- a. Conduct a class conference on—
 - (1) Construction.
 - (2) Rope materials.
 - (3) Relative strength of materials.
 - (4) Signs of deterioration.
 - (5) Methods of finding strength of rope.
 - (6) Effects of treating rope.
- b. Have students test ropes, using pulleys and weights.

IV. TEST.

- a. Have students identify ropes as to kind, size, and purpose.
- b. Question class on points covered in class conference.

V. SUMMARY.

- a. Types and relative strengths of rope.
- b. Rope care.

Subject No. 3. Ropes and Rope Work

LESSON No. 2. Coiling a rope.

OBJECTIVE. To teach correct procedure for coiling rope.

EQUIPMENT AND TRAINING AIDS. Coiled rope, preferably a hand line; coil-rope tool; sketches of types of standards; sketches of steps in coiling rope.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of knowing how to coil rope.

II. DISCUSSION.

a. Purpose of coiling rope:

- (1) For efficient handling.
- (2) To play rope out evenly and surely.
- (3) To preserve rope.

b. Coiling standards:

(1) Requirements.

- (a) Accessibility.
- (b) Length of standards.
- (c) Distance between standards.
- (d) Ability to remove standards.
- (e) Adjustability.

(2) Stationary standards on—

- (a) Wall.
- (b) Bench.

(3) Portable standards on—

- (a) Plank.
- (b) Frame with revolving unit.

(4) Construction; methods of making standards.

c. Making a coil:

(1) Coiling procedure.

- (a) Starting position: eye on standard.
- (b) Direction of coiling.
- (c) Number of turns.
- (d) Number of layers.

(2) Wrapping coil.

- (a) Direction of wrapping.
- (b) Number of turns.

(3) Removing coil from standards.

(4) Making the carrying loops.

(5) Securing ends.

d. Carrying rope coil:

- (1) Loops slung over shoulder.
- (2) Finished end at top.

e. Proper use of rope coil:

- (1) Undoing tie.
- (2) Grasping end of line.
- (3) Dropping coil.

f. Precautions:

- (1) Make loop larger in winter to allow for more clothing.
- (2) Make coils accurately.

III. PRACTICAL WORK. Divide class into three-man groups. Have each group coil line, carry coil to upper story or top of drill tower, and

drop it. Observe neatness and compactness of coil and the efficiency with which it pays out.

IV. TEST. Have each student coil a rope and demonstrate its use without aid or coaching.

V. SUMMARY.

a. Coiling procedure.

b. Importance of neatness.

Subject No. 3. Ropes and Rope Work

LESSON No. 3. Tying fire-service knots and hitches.

OBJECTIVE. To teach the knots and hitches commonly used in the fire service.

EQUIPMENT AND TRAINING AIDS. Short sections of rope; sample knots and hitches.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of knowing how to tie knots. Show what will happen if knots are not properly tied.

II. DISCUSSION.

a. Terms used in rope work:

(1) Knot.

(2) Hitch.

(3) Standing part.

(4) Running end.

(5) Loop.

(6) Right.

(7) Round turn.

(8) Splices.

(a) Full splice.

(b) Eye splice.

(c) Back splice.

b. Characteristics of knots:

(1) Always tied same way.

(2) Can be untied easily.

(3) Weaken rope.

(4) Increase wear on rope.

(5) Tighten when wet.

c. Tying knots and hitches:

(1) Half hitch.

(2) Square knot.

(3) Clove hitch.

(4) Becket bend.

(5) Chimney hitch.

- (6) Bowline.
- (7) Double bowline.
- (8) Running bowline.

III PRACTICAL WORK.

- a. Have each student name the terms used in rope work and apply them to knots.
- b. Have each student tie each knot and hitch.
- c. Have each student make each splice.

IV. TEST.

- a. Have each student tie each knot and name its parts.
- b. Have students identify knots and hitches by feeling them. (Blind-fold if necessary.)

V. SUMMARY.

- a. Importance of good knots in fire fighting and rescue work.
- b. Need for ability to tie and untie knots in the dark.

Subject No. 3. Ropes and Rope Work

LESSON No. 4. Using knots and hitches.

OBJECTIVE. To teach how to use knots and hitches efficiently.

EQUIPMENT AND TRAINING AIDS. Short pieces of rope; ladder; pike pole; ax; small extinguisher; crowbar; door opener; sketches and pictures.

REFERENCES Oklahoma A & M Fire Training Service Manual, Unit I; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of knowing when to use each knot and hitch.

II. DISCUSSION.

a. Uses for knots and hitches:

- (1) Hoisting.
 - (a) Hose.
 - (b) Ladders.
 - (c) Tools and equipment.
- (2) Anchoring.
 - (a) Ladders
 - (b) Hose.
 - (c) Hose rollers.
 - (d) Ends of rope.
 - (e) Equipment.
- (3) Roping off fire area.
- (4) Joining ends of two ropes
 - (a) Permanent splice.
 - (b) Temporary knots.
- (5) Rescue work.
 - (a) Lowering a victim.

- (b) Raising a victim.
- b. Correct uses for each knot and hitch:
 - (1) Hoisting hose.
 - (a) Dry line.
 - 1. Clove hitch.
 - 2. Running bowline.
 - 3. Half hitch.
 - (b) Charged line.
 - 1. Clove hitch.
 - 2. Half hitch.
 - (2) Hoisting a ladder.
 - (a) Bowline.
 - (b) Clove hitch.
 - (3) Hoisting small tools and equipment.
 - (a) Clove hitch with half hitch.
 - (b) Ax tie.
 - (4) Anchoring ladders.
 - (a) Clove hitch.
 - (b) Chimney hitch.
 - (5) Anchoring hose.
 - (a) Clove hitch.
 - (b) Chimney hitch.
 - (6) Anchoring a hose roller: chimney hitch.
 - (7) Anchoring end of rope.
 - (a) Chimney hitch.
 - (b) Bowline.
 - (c) Clove hitch with safety hitch.
 - (8) Rescue knots.
 - (a) Bowline on a bight.
 - (b) Double bowline.
 - (c) Hitch for sliding life line.

c. Precautions.

- (1) Use standard knots only.
- (2) Use safety tie where possible.
- (3) Keep hand on knot until rope is tight.

III. PRACTICAL WORK.

- a. Have each student apply knots and hitches to equipment as taught; have him name all the knots and hitches used.
- b. Have one student tie a knot or hitch and another untie it to see if it was properly tied.
- c. Conduct a class conference on the use, evaluation, and selection of knots and hitches for specific purposes.

IV. TEST.

- a. Prepare test questions to review material covered in lessons 1 through 3.

b. Give each student a problem involving rope work and grade him on the knot he uses and the way he ties it.

c. Repeat test with students blindfolded or in a darkened room.

V. SUMMARY.

a. Necessity for speed and care.

b. Regularity in tying.

c. Personal responsibility for knot or tie once it is in use.

d. Relation of knots to safety of all concerned.

Subject No. 4. Ladder Work

LESSON No. 1. Carrying ladders.

OBJECTIVE. To teach fire fighters how to pick up and carry fire-service ladders.

EQUIPMENT AND TRAINING AIDS. Roof and extension ladders mounted on truck.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit II; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of using proper ladder carries to insure proper operation and greatest safety for fire fighters and bystanders.

II. DISCUSSION.

a. Types of ladders.

(1) Ladders supplied by War Department.

(a) 14-foot roof ladder.

(b) 24-foot extension ladder.

(c) 36-foot extension ladder.

(d) Ladders placed on buildings.

(e) Nonstandard types

(2) Ladders used by municipalities.

(a) Straight.

(b) Extension.

(c) Aerial.

b. Component parts of ladders:

(1) Beam: size, strength.

(2) Rungs: size, spacing.

(3) Heel, foot, or butt.

(4) Top or tip.

(5) Bed or main ladder.

(6) Fly ladder: number.

(7) Pawl or dog: type, operation.

(8) Tie rods; spacing, purpose.

(9) Halyard: length, size, quality.

(10) Finish.

c. Mounting and securing ladders on fire truck:

(1) Types of fasteners used on the post.

(2) Position of end of ladder.

(3) Nesting ladders in one bracket.

(4) Method of releasing fasteners.

d. Ladder carries:

(1) Ladders carried by one man.

(a) Removing ladder from truck.

- (b) Method of carrying.
 - 1. On shoulder.
 - 2. Arm between beams.
 - 3. Under arm.
- (c) Position of ladder.
- (d) Picking ladders up from ground.
- (2) Ladders carried by two men.
 - (a) Removing ladder from truck.
 - (b) Method of carrying.
 - 1. Arm between beams.
 - 2. Under arm.
 - 3. On shoulder.
 - (c) Position of men.
 - 1. On same side.
 - 2. At ends of ladder.
 - (d) Lifting ladder from ground.
 - (e) Lowering ladder to ground.
- (3) Ladders carried by three or more men.
 - (a) Removing ladder from truck.
 - (b) Method of carrying.
 - 1. On shoulder.
 - 2. Arm between rungs.
 - 3. Under arm.
 - (c) Position of men.
 - 1. On same side.
 - 2. At ends of ladder.
 - (d) Lifting ladder from ground.
 - (e) Lowering ladder to ground.

III. PRACTICAL WORK.

- a. Have each student demonstrate the one-man carry.
- b. Divide class into small groups and have them perform each carry, alternating positions so each man works in each position.

IV. TEST. Using the check sheet, grade students on performing ladder carries used by the post fire department.

LADDER CARRIES

JOB: Carrying ladders														
INSTRUC- TOR:	Ladder nomenclature	Removing ladder	Ladder balance during carry	Carrying angle	Position	Attention to safety precautions								
DATE:														

WD AGO Form R-5362, 1 April 1946.

V. SUMMARY.

- a. Importance of keeping ladders in good condition.
- b. Correct method of lifting heavy loads.
- c. Personal and public safety.
- d. Need for efficiency, not speed.

Subject No. 4. Ladder Work

LESSON No. 2. Placing, raising, and lowering ladders.

OBJECTIVE. To develop the ability to perform efficiently any job connected with placing, raising, and lowering ladders.

EQUIPMENT AND TRAINING AIDS. Ladder charts; each ladder used in department.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit II; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of placing, raising, and lowering ladders properly for—

- a. Rescue and extinguishing requirements.
- b. Safety of fire fighters and bystanders.

II. DISCUSSION.

- a. Review of methods of carrying ladders (lesson 1).
- b. Placing ladders.

(1) Position of heel of ladder.

(a) Ladder formula: distance from heel to building equals one-fourth the extended length of the ladder.

(b) Both beams resting on a firm, level foundation.

- (2) Overhead Obstructions.
- (3) Placing ladder in a window.
 - (a) Position in window opening.
 - (b) Avoiding interference with hose lines.
- c. Raising and lowering a roof ladder:
 - (1) Placing ladder.
 - (a) Slope of roof.
 - (b) Condition of roof.
 - (2) Raising procedure; position of hooks.
 - (3) Lowering procedure (reverse of raising).
- d. Raising and lowering an extension ladder:
 - (1) Basic considerations.
 - (a) Length, weight, and kind of ladder.
 - (b) Condition of foundation on which ladder rests.
 - (c) Obstacles to be overcome or avoided.
 - (d) Angle of ladder to building.
 - (e) Position of fly.
 - (2) Raising procedure, one man; physical condition of man raising ladder.
 - (3) Lowering procedure, one man.
 - (4) Raising procedure, two or more men.
 - (a) Right angles to building.
 - (b) Parallel to building.
 - (c) Beam raise.
 - (d) Church or dome raise.
 - (e) Precautions.
 - (5) Lowering procedure, two or more men.

III. PRACTICAL WORK.

- a. Have students place ladder, using ladder formula. Repeat until they can tell at a glance when ladder is at proper climbing angle.
- b. Divide class into groups; have each group practice the various raises, rotating men to different position so each man performs all jobs.
- c. Have each group carry and place roof ladder on roof.

IV. TEST.

- a. Question students on their understanding of methods of placing, raising, and lowering ladders.
- b. Using check sheet, grade students on practical work in placing, raising, and lowering ladders.

PLACING, RAISING, AND LOWERING LADDERS

JOB: Placing, raising, and lowering ladders.															
INSTRUC- TOR:	Carrying ladder	Placing ladder	Position of hands, feet and body	Raising ladder	Lowering ladder	Observance of safety precautions	Ladder climbing	Interest in work	Physical activity						
DATE:															

WD AGO Form R-5363, 1 April 1946.

V. SUMMARY.

- a. Methods of raising ladders.
- b. Importance of coordination and teamwork.
- c. Comparative advantages of each ladder raise. When to use each method.
- d. Safety precautions.
 - (1) Proper lifting practices.
 - (2) Use of ladder lock.

Subject No. 4. Ladder Work

LESSON No. 3. Climbing and working on ladders.

OBJECTIVE. To develop the ability to climb a ladder with rhythm, ease, and safety and to work safely on ladders with tools and equipment.

EQUIPMENT AND TRAINING AIDS. Ladders set for climbing; rope hose tool or other anchoring equipment; hand tools.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit II; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of safe working habits in climbing and working from ladders.

II. DISCUSSION.

- a. Review of lessons 1 and 2.
- b. Climbing a ladder:
 - (1) Position of arms and hands.
 - (a) Both hands free.
 - (b) One hand free.

- (2) Position of feet.
- (3) Position of body.
- (4) Position of head and eyes.
- (5) Climbing speed and rhythm. Use of hands and feet.
Ladder sway.

c. Working on ladder.

- (1) Types of jobs.
 - (a) Rescue.
 - (b) Handling and using hose.
 - (c) Handling ladders.
 - (c) Handling and using tools.
- (2) Anchoring to ladder.
 - (a) Leg lock.
 - 1. Tall man.
 - 2. Short man.
 - 3. Right leg.
 - 4. Left leg.
 - (b) Rope hose tool.
 - (c) Safety belt.

d. General safety rules:

- (1) Use hands on rungs when unencumbered.
- (2) Use hands on beams when working from ladder.
- (3) Always use leg lock whenever both hands are off ladder.
- (4) Keep out from ladder to maintain equilibrium.
- (5) Climb with rhythm, not too fast.
- (6) Check of men on ladder to prevent overload.
- (7) Watch pressure when handling hose line from ladder.
- (8) Anchor ladder if it is to be used in one position for an extended period.
- (9) Check dogs by glance when transferring to fly ladders.

III. PRACTICAL WORK.

- a. Have each student climb ladder unencumbered under supervision of instructor. Have him stop and descend if he becomes unsure.
- b. Have student use leg lock and rope hose tool or safety belt.
- c. Have each student climb ladder while encumbered.

IV. TEST.

- a. Question students on main points of climbing and working from ladders.
- b. Question students about inspection and maintenance of ladders.
- c. Using check sheet, grade students on ability to climb and work on ladders.

CLIMBING AND WORK ON LADDERS

JOB: Climbing and working on ladders.												
INSTRUCTOR:	Carrying ladder	Placing ladder	Position of hands	Position of feet	Body carriage	Eyes	Checking ladder dogs	Observance of safety rules	Climbing technique	Use of leg lock	Attention to spacing	
DATE:												

WD AGO Form R-5364, 1 April 1946.

V. SUMMARY.

- a. Importance of safety precautions.
- b. Climbing technique.

Subject No. 5. Fire Hose

LESSON No. 1. Care and use of fire hose.

OBJECTIVE. To familiarize fire fighters with all types and sizes of fire hose, their uses, and their care.

EQUIPMENT AND TRAINING AIDS. Samples of all types and sizes of fire hose used on post.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit III; TM 5-692 and 5-687.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of fire hose in fire fighting. Fire fighters' responsibility for hose care.

II. DISCUSSION.

a. Types of fire hose.

(1) Rubber-covered rubber-lined hose.

(a) Sizes.

1. $\frac{3}{4}$ - and 1-inch hose.

2. 3-, 4-, and $4\frac{1}{2}$ -inch reinforced hose.

(b) Construction.

(c) Couplings.

(d) Length of sections.

(e) Nozzle discharge.

(f) How carried on apparatus.

(2) Cotton-covered rubber-lined hose.

(g) Uses for each size.

(a) Sizes.

1. $1\frac{1}{2}$ -inch hose.

2. $2\frac{1}{2}$ -inch hose.

3. $3\frac{1}{2}$ and 4-inch hose.

(b) Construction.

1. Single jacket.

2. Double jacket.

(c) Couplings.

1. Bronze alloy.

2. Malleable iron.

3. National standard thread.

(d) Length of sections.

(e) Nozzle discharge.

(f) Uses for each size.

(3) Unlined linen hose.

(a) Size: $1\frac{1}{2}$ -inch hose.

(b) Construction.

(c) Couplings

1. Bronze alloy.

2. Malleable iron.

3. National standard thread.

4. Pipe thread.

(d) Length of sections.

(e) Nozzle discharge.

(f) Uses.

b. Causes and treatment of hose:

(1) Mechanical injury.

(a) Dragging hose.

(b) Pulsation or vibration.

(c) Excessive pressure.

(d) Driving vehicle over hose.

(e) Freezing.

(f) Dropping hose.

(2) Heat injury.

(a) Burning or scorching.

(b) Hot liquids.

(c) Improper storage.

(3) Chemical injury.

(a) Acids.

(b) Gasoline.

(c) Oil and grease.

(d) Strong soap.

c. Coupling maintenance:

(1) Rough handling.

(2) Gaskets.

(3) Coupling replacement.

III. TEST. Using the check list, grade each student on—

a. Ability to identify each size and type hose used on the post and tell when each is used.

b. Knowledge of causes of hose damage and methods of prevention or treatment.

CARE AND USE OF FIRE HOSE

JOB: Using and caring for hose.													
INSTRUC- TOR:	Hose types	Hose sizes	Hose uses	Hose care	Performance								
DATE:													

IV. SUMMARY.

- a. Responsibility for hose maintenance.
- b. Importance of examining hose and couplings constantly for signs of potential failure.
- c. Need for acting immediately to prevent hose damage.

Subject No. 5. Fire Hose

LESSON No. 2. Making hose and nozzle connections.

OBJECTIVE. To develop the ability to make hose and nozzle connections efficiently.

EQUIPMENT AND TRAINING AIDS. Hose, with all types of couplings used on post; spanners; nozzles; connections; fire truck.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit III; TM 5-692 and 5-687.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of making hose connections because of their application to almost every phase of fire fighting. Need for constant practice to develop skill.

II. DISCUSSION.

- a. Review of types of hose found on post (lesson 1).
- b. Hose couplings.

(1) Types of couplings.

(a) Double male and double female couplings.

1. Where used.
2. How used.

(b) Special couplings.

1. Y-coupling: $2\frac{1}{2}$ - by $1\frac{1}{2}$ - by $1\frac{1}{2}$ -inch, and $2\frac{1}{2}$ - by $2\frac{1}{2}$ - by $2\frac{1}{2}$ -inch.
2. Siamese coupling: $2\frac{1}{2}$ - by $2\frac{1}{2}$ - by $2\frac{1}{2}$ -inch.
3. Reducer coupling.
4. Where used.
5. How used.
6. When used.

(2) Hose threads.

- (a) National Standard threads.
- (b) Higby thread.

(3) Coupling lugs.

- (a) Pin lug, $1\frac{1}{2}$ - and $2\frac{1}{2}$ -inch sizes.
- (b) Rocker lug, $1\frac{1}{2}$ - and $2\frac{1}{2}$ -inch sizes.
- (c) Guard lug, $1\frac{1}{2}$ - and $2\frac{1}{2}$ -inch sizes.
- (d) Extended lug on suction hose.
- (e) Hole type couplings on booster hose.

(4) Types of spanners.

- (a) Booster hose.

- (b) Universal for 1½- and 2½-inch hose.
- (c) Suction hose.
- c. Types of nozzles and tips:
 - (1) Booster nozzles; ¼- and ⅜-inch tips.
 - (2) 1½-inch shutoff nozzles: ½- and ⅝-inch tips.
 - (3) 2½-inch shutoff nozzles: ¾-, ⅞-, 1-, 1⅛-, and 1¼-inch tips.
 - (4) 2½-inch Underwriters' playpipes: 1-, 1⅛-, and 1¼-inch tips.
 - (5) Hip-pack foam nozzles.
 - (6) Fog nozzles and applicators.
 - (7) Distributor or cellar nozzle.
- d. Making hose connections:
 - (1) One man.
 - (a) On ground: Step on male coupling.
 - (b) Over knee: "wring" couplings apart.
 - (2) Two men.
 - (3) Engage threads by—
 - (a) Reversing until click is heard.
 - (b) Pairing markings on lugs.
 - (c) Feel.
- e. Connecting nozzle:
 - (1) One man.
 - (a) On ground.
 - (b) In hand.
 - (2) Two men.
- f. Breaking connections:
 - (1) Using spanner wrench.
 - (2) On ground or pavement.
 - (3) On soft ground: hose across knee.
- g. Safety precautions:
 - (1) Always feel for gasket before making connection. Do not assume it is there.
 - (2) Never drop couplings or appliances because of—
 - (a) Damage to threads.
 - (b) Damage to nozzle tips.
 - (c) Possibility of picking up dirt that will interfere with operation.
 - (d) Possibility of losing them.
 - (3) Remain cool. Speed is secondary to efficiency.

III. PRACTICAL WORK.

- a. Have each student practice making and breaking connections.
- b. Have each student practice putting on nozzle and other appliances until he is proficient.

- IV. TEST. Use check sheet to grade students on ability to—
- Make and break couplings.
 - Put on nozzle and other appliances.

HOSE AND NOZZLE CONNECTIONS

JOB: Making hose and nozzle con- nections.													
INSTRUC- TOR:	Handling connections	Handling appliances	Smoothness of work	Speed	Checking for gaskets	Attention to safety	Use of proper fittings	Teamwork	Replacing equipment	Making connections	Condition of hydrant after job is completed		
DATE:													

WD AGO Form R-5366, 1 April 1946.

V. SUMMARY.

- Importance of skill and speed, with emphasis on carefulness.
- Ability to identify fittings and appliances.

Subject No. 5. Fire Hose

LESSON No. 3. Making hose loads and hose-load finishes.

OBJECTIVE. To teach fire fighters how to load hose.

EQUIPMENT AND TRAINING AIDS. Fire truck and a load of fire hose.

REFERENCES. Oklahoma A & M Fire Service Training Manuals, Unit III; TM 5-687 and 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of loading fire hose correctly to insure minimum delay at fires.

II. DISCUSSION.

a. Factors affecting choice of hose load:

- Amount of hose that can be loaded in hose body.
- Amount of hose distortion and number of sharp bends in loaded hose.
- Ease with which hose pays out during lay.
- Ease with which shoulder loads can be formed.
- Number of men on apparatus.

- (6) Nature of property risk being protected with respect to protection required.
- (7) Capacity and pressure of water system.
- (8) Appearance of completed load.
- (9) Stability of hose load.
- b. General loading instructions:
 - (1) Clean hose body thoroughly.
 - (2) Start load in right-hand corner.
 - (3) Pack hose solidly, but not so tight that it binds in hose body.
 - (4) Use Dutchmen in restricted space to keep couplings from jamming.
 - (5) Count hose as it is loaded so length in each layer and total amount in hose body are known.
 - (6) Load hose so bends do not come at same place as during previous loadings.
 - (7) Have a 2-inch offset between ends of adjoining folds so bends are not crowded.
- c. Horseshoe hose load:
 - (1) Characteristics.
 - (a) Fewest sharp bends.
 - (b) Easily loaded.
 - (c) Pays out freely.
 - (d) Neat appearance when properly loaded.
 - (e) Not arranged for advancing hose quickly.
 - (2) Making the load.
 - (a) Start in forward corner of hose body.
 - (b) Lay hose around inside of hose body, reversing hose on itself at rear of hose body until space is filled. This forms one layer.
 - (c) Make bends on one-half the hose 2-inches shorter than other side so returning band will not protrude.
 - (d) Run band around end of hose into hose body and raise it to start next layer.
- d. Accordion hose load:
 - (1) Characteristics.
 - (a) Quickly loaded.
 - (b) Compact, neat appearance.
 - (c) Shoulder loads readily formed for advancing.
 - (d) More sharp bends.
 - (e) Couplings may catch in paying out.
 - (2) Making the load; fold hose back and forth.
- e. Baffle-board load:
 - (1) Characteristics
 - (a) Permits laying two lines at once.

- (b) Provides option of straight or reverse lay.
 - (c) Permits a straight to reverse lay without double male and female couplings.
 - (d) Permits loading two sizes of hose.
- (2) Making the load.
 - (a) Set partition in hose body. Exact location depends on amount of hose to be laid on each side of partition.
 - (b) Lay hose on each side of partition, using horseshoe or accordion load. Load one side for straight lay and the other for reverse lay.
- f. Hose-load finishes:
 - (1) Factors affecting choice of finish.
 - (a) Straight lay (hydrant to fire).
 - (b) Reverse lay (fire to hydrant).
 - (c) Manpower available.
 - (d) Capacity and pressure of water supply system.
 - (2) Doughnut-roll finish.
 - (a) Best suited for straight lay.
 - (b) Made with female coupling out. Attach hydrant wrench and spanner by ladder strap or other means.
 - (c) Coil hose so it unwinds easily.
 - (d) Place loose hose on top of body to give hydrant man time to reach hydrant.
 - (e) May be made with two doughnuts to accomplish same.
 - (3) Skid-load finish.
 - (a) Best suited for reverse lay.
 - (b) One man can easily unload 100 to 150 feet of hose for advancement.
 - (c) Shoulder loads or under-arm bundles are easily formed.
 - (d) Not suitable for evenly divided hose body.
 - (e) 1½-inch hose can be carried on top of skid.

III. PRACTICAL WORK.

- a. Have learners load hose body, using load adopted by post.
- b. Have learners make hose-load finish used by post.

IV. TEST. Using check sheet, grade students on—

- a. Ability to load hose and make hose-load finish.
- b. Knowledge of requirements of hose load and finish.
- c. Understanding of comparative advantages of various loads and finishes.

HOSE LOADS AND FINISHES

JOB: Making hose loads and hose load finishes.	Understanding of load factors	Use of Dutchmen	Counting hose	Loading technique	Neatness of load	Dropped couplings	Load finish					
INSTRUCTOR:												
DATE:												

WD AGO Form R-5367, 1 April 1946.

V. SUMMARY.

- a. Need for hose to unload from apparatus quickly without binding.
- b. Importance of reloading at frequent intervals to change location of hose folds.
- c. Relation of hose load and finish to other fire-service requirements.
- d. Relation of hose load and finish to other fire-service requirements.
- e. Safety precautions.

Subject No. 5. Fire Hose

LESSON No. 4. Making a hydrant connection.

OBJECTIVE. To teach how to make a hydrant connection safely and quickly.

EQUIPMENT AND TRAINING AIDS. Fire truck with hose and hydrant wrench, at hydrant.

REFERENCES. Oklahoma A & M Fire Service Training Manuals, Unit III; TM 5-692 and 5-687.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of speed and accuracy in making hydrant connections.

II. DISCUSSION.

a. En route to fire.

- (1) Determine from senior fire officer what type lay is to be made.
- (2) Check hose-load finish to be sure it will not tangle or snag.
- (3) Check for hydrant wrench and spanner.
- (4) Make sure connection is available for hookup to hydrant.
- (5) Watch for signal from fire officer to start lay.

b. At fire:

- (1) Hold wrenches in hand nearest hydrant.
- (2) Hold hose in hand away from hydrant.
- (3) Step off truck 25 feet before it reaches hydrant. Driver slows truck as it approaches hydrant and accelerates as soon as hydrant man steps off.
- (4) Run to hydrant and snub hose around barrel to prevent truck from jerking hose away.
- (5) Face hydrant outlet nearest fire; remove cap and place wrench on operating nut.
- (6) Remove loop of hose from around hydrant and make connection.
- (7) If hose clamp is used, turn water on immediately; otherwise, wait for signal from fire officer.
- (8) Check connection for leaks.
- (9) Follow hose line to fire, straightening kinks and tightening leaky couplings. Place hose along side of road to permit subsequent apparatus room to maneuver.
- (10) When turning off the water supply, close the valve slowly. Turn operating nut so it seats firmly, then release until it operates freely. Check to be sure hydrant barrel drains properly.

III. PRACTICAL WORK. Have each student go through entire procedure, from stepping off the truck to opening the valve.

IV. TEST. Using check sheet, grade each student on—

a. Proficiency in making hydrant connection.

HYDRANT CONNECTION

JOB: Making a hydrant connection.	INSTRUCTOR:	DATE:	Checking load finish enroute to fire	Obedience to signals	Leaving truck	Holding hose	Snubbing hose	Making connection	Opening hydrant	Removing kinks from hose	Interest	Ability	Safety			

b. Understanding of part hose load and finish play in successful performance.

V. SUMMARY.

- a. Importance of understanding entire evolution and signals used.
- b. Need for cooperation between driver and hydrant man.
- c. Importance of knowing all hydrant locations on post
- d. Procedure for opening and closing hydrants.
- e. Safety precautions.

Subject No. 5. Fire Hose

LESSON No. 5. Making hose lays.

OBJECTIVE. To teach methods of making hose lays quickly and safely.

EQUIPMENT AND TRAINING AIDS. Hose-lay diagram, fire truck, hose, nozzles, connections.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit III; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of teamwork and cooperation in making hose lays. Importance of doing job correctly and speedily.

II. DISCUSSION.

a. Types of hose lays:

- (1) Straight lay: from hydrant to fire.
- (2) Reverse lay: from fire to hydrant.
- (3) Straight to reverse lay. (Used when fire is inaccessible to apparatus.)

b. Straight lay:

(1) When used.

- (a) When hydrant pressure is enough for fire stream.
- (b) As temporary line until second line is laid.
- (c) When all auxiliary equipment is near fire, where ladders, axes, and other equipment are available quickly.
- (d) When several trucks answer an alarm. One truck can lay 2½-inch back-up line as standard operating procedure.
- (e) When hydrant is encountered first at emergency and it is readily apparent that 2½-inch lines will be needed.

(2) Making a straight lay.

- (a) Make hydrant connection.
- (b) Drive apparatus to fire.
- (c) Unload enough hose for working line.
- (d) Attach nozzle.

c. Making a reverse lay:

- (1) When loaded for straight lay.
 - (a) Stop truck at fire.
 - (b) Unload enough hose for working line with double male connection and nozzle attached.
 - (c) Unload ladders, ax, pike pole, and auxiliary equipment that may be needed.
 - (d) Drive to hydrant, break line, and attach it to discharge outlet, using double female connection. If hydrant pressure is adequate, make direct connection; otherwise, place pump in circuit.
- (2) When loaded for reverse lay.
 - (a) Stop truck at fire.
 - (b) Unload skid-load finish.
 - (c) Unload ladders, axes, and other equipment.
 - (d) Drive to hydrant, break hose line, and attach it to discharge outlet. If hydrant pressure is adequate, make direct connection; otherwise, place pump in circuit.

d. Making a straight to reverse lay:

- (1) Without baffle-board load.
 - (a) Lay line from hydrant as near fire as possible.
 - (b) Stop apparatus and break line.
 - (c) Attach double female coupling to end of line coming from hydrant.
 - (d) Attach double male coupling and nozzle to end of line still in hose body.
 - (e) Advance this line to the fire.
 - (f) Break line at apparatus.
 - (g) Couple two lines together.
 - (h) Apparatus can return to hydrant and place pump in circuit.
- (2) With baffle-board load. Use same procedure, but eliminate steps (c) and (d). Baffle-board load speeds up evolution.

e. Safety precautions:

- (1) Do not drop couplings or nozzles.
- (2) Protect equipment from injury.
- (3) Check couplings for presence of hose gaskets.
- (4) Hose evolutions are not complete until hose is picked up and reloaded into the hose body. Do not keep apparatus out of service more than necessary.

III. PRACTICAL WORK.

- a. Have students make a straight lay. Rotate men so each man performs all tasks involved.

b. Have students make a reverse lay. Rotate men so each man performs all tasks involved.

c. Have students make a straight to reverse lay. Rotate men so each man performs all tasks involved.

IV. TEST. Using check sheet, grade students on—

a. Ability to make each hose lay.

b. Understanding of when and why each layout is used.

HOSE LAYS

Handling couplings	Attention to safety rule	Understanding of layout	Use of correct fittings	Following job sequence	Agility	Capability	Speed and smoothness of operation	Checking for gaskets	Opening hydrant	Teamwork	Reloading equipment	Making connections	Replacing equipment		

WD AGO Form R-5369, 1 April 1946.

V. SUMMARY.

a. Relationship of lay-out to—

(1) Hydrant pressures.

(2) Hydrant spacings.

(3) Water-main sizes and pressure drop caused by opening additional lines.

b. Relationship of available manpower to lay-out selected.

c. Relationship of size of fire to lay-out selected.

d. Relationship of number of pieces of apparatus at fire to lay-out selected.

e. Relationship of structures and type of fire contents involved to lay-out selected.

Subject No. 5. Fire Hose

LESSON No. 6. Advancing hose lines.

OBJECTIVE. To teach methods of advancing hose lines quickly and safely through teamwork and a thorough understanding of the job.

EQUIPMENT AND TRAINING AIDS. Hose-line diagrams, fire truck, hose, nozzles and connections.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit III; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of teamwork in advancing hose lines.
Problems involved. Need for a physical-fitness program.

II. DISCUSSION.

a. Hose carries.

b. Advancing single hose lines.

(1) Factors to consider.

(a) Type of load finish.

(b) Locations of fire.

1. Ground or ground floor.

2. Upper floors.

(c) Advantages of advancing dry line.

(d) Manpower available.

1. Number.

2. Degree of training.

(e) Nature of area over which hose must be advanced.

(2) Advancing straightway.

(a) How to carry nozzle.

(b) How to carry hose.

1. Shoulder carry with section straight.

2. Shoulder carry with accordion fold.

3. Under-arm carry with accordion load.

4. Carry using rope hose tool.

5. Others.

(c) Anchoring.

(3) Advancing up ladder:

(a) How to carry hose.

(b) Using pike pole.

(c) Anchoring.

(4) Advancing up stairway.

(a) Hose up stairwell.

1. Under-arm carry.

2. Using pike pole.

(b) Hose laid on steps.

1. Keeping line dry.

2. Carrying hose.

(c) Anchoring.

(5) Advancing up fire escape.

(a) Using pike pole.

(b) Anchoring.

(6) Advancing up side of building.

(a) Using rope (hose roller if available).

(b) Using pike pole through windows.

(c) Anchoring.

(7) Advancing line when short-handed.

c. Safety precautions:

- (1) Advance dry line whenever practicable.
- (2) Observe safety precautions when lifting and carrying hose.
- (3) Unload correct amount of hose from hose body.
- (4) All men work on same side when advancing hose.
- (5) Anchor lines when safety dictates.

III. PRACTICAL WORK. Divide class into groups and have each group advance hose under all conditions covered in lesson. Change positions so they all become familiar with every job requirement.

IV. TEST. Use check sheet to grade students on—

ADVANCING HOSE LINES

JOB: Advancing hose lines.													
INSTRUC- TOR:	Proper sequence	Handling couplings	Attention to safety rules	Teamwork	Performance	Replacing equipment	Understanding of job components	Unloading correct amount of hose	Anchoring hose line	Completeness			
DATE:													

WD AGO Form R-5370, 1 April 1946.

V. SUMMARY.

- a. Importance of teamwork.
- b. Responsibility for avoiding unnecessary property damage.
- c. Safety.

Subject No. 5. Fire Hose

LESSON No. 7. Replacing burst section of hose line.

OBJECTIVE. To teach methods of replacing burst section of hose quickly and safely.

EQUIPMENT AND TRAINING AIDS. Hose line, extra section of hose, rope.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit III; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of speed and efficiency in replacing burst section of hose. Value of preventive maintenance in reducing possibility of hose bursting.

II. DISCUSSION.

a. Replacing burst section in hose stretched on ground.

- (1) Get replacement section.
 - (a) Doughnut roll.
 - (b) Accordion fold.
- (2) Place replacement alongside burst section.
- (3) Shut off water.
 - (a) At hydrant or pump.
 - (b) Using hose clamp.
 - (c) Folding hose on itself to restrict flow.
- (4) Break couplings.
- (5) Couple replacement to line.
- (6) Turn on water.

b. Replacing burst section in vertical line:

- (1) Get replacement section as above.
- (2) Shut off water.
- (3) Tie hand line back of first coupling inside building or root.
- (4) Lower until burst section is on ground.
- (5) Replace burst section.
- (6) Hoist into position and recouple.
- (7) Turn on water.

c. Replacing burst section inside building or on roof:

- (1) Get replacement section.
- (2) Shut off water.
- (3) Break coupling on ground and insert good section.
- (4) Hoist hose one section length.
- (5) Remove burst section and recouple.
- (6) Turn on water.

III. PRACTICAL WORK. Have students replace a burst section of hose. Proceed slowly at first, stopping frequently to explain in detail reasons for the procedure, advantages, and safety precautions. Rotate men in crews so each man has an opportunity to learn all parts of the job.

REPLACING BURST SECTIONS OF HOSE

JOB: Replacing a burst section of hose.												
INSTRUCTOR:	Operation done in sequence	Handling couplings	Turning on water	Carrying hose	Use of knots	Teamwork	Knowledge of all phases	Attention to safety precautions	Reloading equipment	Speed and smoothness of performance	Agility	
DATE:												

WD AGO Form R-5371, 1 April 1946.

IV. TEST. Have class replace a burst section of hose. Use check sheet to grade students' skill.

V. SUMMARY.

- a. Steps in replacing burst section of hose.
- b. Importance of speed and teamwork.
- c. Safety precautions.

Subject No. 5. Fire Hose

LESSON No. 8. Inspecting, maintaining, and testing fire hose.

OBJECTIVE. To develop an understanding of the need for keeping fire hose in the best possible condition; to teach how to inspect, maintain, and test hose.

EQUIPMENT AND TRAINING AIDS. Samples of hose, damaged if possible; fire truck; washing equipment; drying rack.

REFERENCES. Oklahoma A & M Fire Service Training Manuals, Unit III; TM 5-692 and 5-687.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Dependence which fire fighters place on fire hose in an emergency. Fire fighter's responsibility for keeping hose in good condition.

II. DISCUSSION.

- a. Review of fire-hose requirements (lesson 1).
- b. Inspection:

- (1) Damage to jacket.
 - (a) Mechanical injury.
 1. Cuts.
 2. Abrasions or chafed places.
 3. Hose run over by heavy apparatus.
 - (b) Mildew and mold.
 - (c) Burns.
 - (d) Gasoline and oil damage.
 - (e) Acid damage.
 - (f) Effect of dirt and foreign matter.
- (2) Damage to couplings.
 - (a) Dents and bruises.
 - (b) Damaged threads.
 - (c) Lugs having sharp corners.
 - (d) Gaskets—
 1. Missing.
 2. Groove worn on face.
 - (e) Security on hose.
- (3) Damage to rubber lining.
 - (a) Cracks of checks at fold.
 - (b) Blisters or breaks in suction-hose lining.
- (4) Record of conditions found and action taken.

c. Maintenance:

- (1) Care during use.
- (2) Washing and drying.
- (3) Removing acids, gasoline, and oil.
- (4) Changing hose on apparatus.
- (5) Maintaining couplings.
- (6) Replacing couplings.
- (7) Storing hose.
- (8) Records of action taken.

d. Tests:

- (1) Frequency.
- (2) Test specifications.
- (3) Methods of testing.
- (4) Records of tests.

III. PRACTICAL WORK. Have each student inspect a section of damaged hose. Have each student perform the necessary maintenance evolutions on fire hose.

IV. TEST. Using check sheet, grade students on—

- a. Ability to inspect a load of hose and make the applicable entries on record cards.
- b. Knowledge of maintenance procedures and hose precautions.

HOSE MAINTENANCE PROCEDURES

JOB: Inspecting, maintain- ing, and testing hose.										
INSTRUCTOR:	Detecting flaws	Attention to safety precautions	Handling couplings	Performance	Following correct sequence	Using correct pressure	Using correct test procedure	Handling hose	Washing hose	
DATE:										

WD AGO Form R-5372, 1 April 1946.

V. SUMMARY.

- a. Importance of inspections, maintenance, and testing to life of hose.
- b. Cost of fire hose.
- c. Dependence placed on fire hose.
- d. Safety precautions during testing.

Subject No. 6. Fire Streams

LESSON No. 1. Analyzing fire-stream requirements.

OBJECTIVE. To teach students how to analyze stream requirements of fires; how streams are applied.

EQUIPMENT AND TRAINING AIDS. Pictures of fire streams.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit V; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Value of knowing the proper fire streams to use on fires. Effect of using wrong fire stream.

II. DISCUSSION.

a. Solid streams:

(1) When used.

(a) Type of fire.

(b) Size of fire.

(2) How applied.

(a) Size of stream.

(b) Reach of stream. Use blackboard to show how solid stream should go through a circle at the required distance.

b. Broken streams:

(1) When used: type of fire.

(2) How applied.

(3) Safety features.

(a) Electricity.

(b) Chemicals.

(c) Gases.

c. Small streams:

(1) When used; type of fire.

(2) How applied.

(3) Safety features.

(a) Electricity.

(b) Cremicals.

(c) Gases.

(4) Limitations.

d. Fog streams:

(1) When used.

(a) Type of fire.

(b) Effect of fog on fire.

(c) Limitations.

(2) How applied.

e. Water curtains:

(1) Description of water curtain; how to produce it.

(2) When used: type of fire.

(3) How applied.

f. Master streams:

- (1) Description of master stream; how to produce it.
- (2) When used: type of fire.
- (3) How applied.

g. Precautions:

- (1) Pressure.
- (2) Limitations of streams.

III. PRACTICAL WORK. Demonstrate types of streams, then conduct a conference on use of each type.

IV. TEST. Have each student describe at least two streams and explain why and how they are used.

V. SUMMARY.

- a. Types of fire streams and their uses.
- b. Importance of being able to estimate requirements of a fire.
- c. Limitations of fire streams.

Subject No. 6. Fire Streams

LESSON No. 2. Analyzing factors that influence fire streams.

OBJECTIVE. To familiarize fire fighters with factors influencing fire streams.

EQUIPMENT AND TRAINING AIDS. Charts of fire streams.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit V; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance to fire fighter of factors influencing fire streams.

II. DISCUSSION.

a. Water supply:

- (1) Capacity of system and total water available.
- (2) Distribution design and rate of supply.
- (3) Pipe-line friction loss.
- (4) Hydrant pressure.
- (5) Fire-fighting requirements.

b. Capacity of water systems:

- (1) Water supply for post use.
- (2) Water supply for fire service.

c. Fire-fighting requirements:

- (1) Rate of flow and residual pressure.
 - (a) Thinly built section.
 - (b) Closely built section.
 - (c) High-value section.
- (2) Importance of being familiar with water systems.

d. Fire hydrants:

- (1) Design.

- (2) Operation.
- (3) Maintenance.
- e. Fire-apparatus pumps.
- f. Effect of hose on fire streams:
 - (1) Gaskets protruding in stream.
 - (2) Roughened rubber lining.
 - (3) Leaking or distorted hose coupling.
- g. Nozzles:
 - (1) Shape of tip.
 - (2) Condition of tip.
 - (3) Size of tip.

III. PRACTICAL WORK. Conduct class discussion using maps of water-main lay-outs.

IV. TEST. Prepare questions on hydrant design and operation, fire-apparatus pumps, nozzles, and capacity of post water supply system.

V. SUMMARY. Importance of knowing—

- a. Water systems.
- b. Fire-fighting requirements.
- c. Friction laws.

Subject No. 6. Fire Streams

LESSON No. 3. Producing fire streams.

OBJECTIVE. To familiarize students with types of fire streams and how to produce them.

EQUIPMENT AND TRAINING AIDS. Pumper, hose, nozzles, tips, hydrant, wrenches, supply of water, and pump-pressure charts.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit V; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

- I. INTRODUCTION. Types of fire streams and the importance of each.
- II. DISCUSSION.
 - a. Characteristics required:
 - (1) Rate of flow.
 - (2) Effective range.
 - (3) Penetration and deflection.
 - (4) Shape of stream.
 - b. Meeting requirements: with pumper coupled to a hydrant, produce various solid streams, calling attention to—
 - (1) Pressure.
 - (2) Range.
 - (3) Size of stream.
 - (4) Shape of stream.
 - c. Broken streams:

- (1) Required characteristics.
- (2) Meeting requirements.
 - (a) Breaking the stream.
 - (b) Using two solid streams.
- d. Small streams:
 - (1) Pressure.
 - (2) Range.
 - (3) Size of stream.
- e. Fog streams:
 - (1) Definition.
 - (2) Required characteristics.
 - (a) Type of fog.
 - (b) Effective range.
 - (3) Meeting requirements.
 - (a) Nozzle types.
 - (b) Applicators.
 - (c) Pressures.
 - (4) Limitations.
- f. Water curtains:
 - (1) Definition.
 - (2) Required characteristics.
 - (3) Meeting requirements.
 - (a) Special nozzle.
 - (b) Special permanent installation.
 - (c) Using a solid stream.
- g. Master streams:
 - (1) Stream characteristics required.
 - (2) Meeting requirements.
 - (a) Nozzles.
 - (b) Operations.

III. PRACTICAL WORK. Have each student operate pump and adjust hose line to produce each type of stream. (If this is not possible, use skilled operator as demonstrator and have class tell operator what pump and nozzle settings are needed to produce each type of stream.)

IV. TEST. Grade students on ability to produce at least two types of streams. (If this is not possible, prepare questions to test students' knowledge of settings used to produce each type of stream.)

V. SUMMARY.

- a. Types of fire streams and how they are produced.
- b. Limitations of each stream.
- c. Importance of using correct stream in each situation.

Subject No. 6. Fire Streams

LESSON No. 4. Making fire-stream calculations.

OBJECTIVE. To teach how to make rapid and correct fire-stream

calculations; to teach the limitations of fire pumps.
EQUIPMENT AND TRAINING AIDS. Pumper, hose, water supply,
pump-pressure charts.

REFERENCES. Oklahoma A & M Fire Service Training Manual,
Unit V; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of fire-stream calculations in correct
pump operation and efficient fire fighting.

II. DISCUSSION.

- a. Simple hydraulics:
 - (1) Static fluids.
 - (2) Flowing fluids.
- b. Elevation calculations:
 - (1) Elevation of suction source.
 - (2) Pumping to heights or depths.
- c. Friction-loss calculations:
 - (1) Definition of friction loss.
 - (2) Cause of excessive loss.
 - (3) Reduction of loss.
- d. Engine and hydrant-pressure calculations; net pump pressures.
- e. Hydrant-discharge calculations:
 - (1) Hydrant butt-flow test.
 - (2) Area fire-flow test.
- f. Fire-stream calculations:
 - (1) Effective range of streams.
 - (2) Effect of wind.
 - (3) Charts and tables.
- g. Small-stream calculations: calculations for tips used on post.
- h. Calculations for special lays of hose:
 - (1) Siamese lines.
 - (2) Y-lines.
 - (3) Relay lines.

III. PRACTICAL WORK. Draw diagrams on lays on blackboard and
have each student explain friction loss, correct pump pressure, and dis-
charge of water in gallons per minute.

IV. TEST. Have students set pump pressures on apparatus, using
different hose lays and tips sizes.

V. SUMMARY. Necessity of knowing fire-stream calculations for effi-
cient fire-pump operation.

Subject No. 7. Fire Apparatus

LESSON No. 1. Using fire apparatus.

OBJECTIVE. To teach how to operate and maintain fire apparatus.

EQUIPMENT AND TRAINING AIDS. Each type of pumper used, with its standard equipment.

REFERENCES. Oklahoma A & M Fire Service Training Manuals. Unit VI; TM 5-687 and 5-685 (Fire Protection and Prevention—Repairs and Utilities (when published)).

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Necessity for understanding fully the operation, care, and preventive maintenance of fire apparatus.

II. DISCUSSION.

a. Types of fire apparatus:

- (1) Hand-drawn hose carts.
- (2) Hand-pumped fire pumps.
- (3) Horse-drawn apparatus.
- (4) Steam-operated pumps.
- (5) Gasoline-powered truck and pumps.

b. Fire-apparatus requirements:

- (1) Transportation requirements.
- (2) Pumping requirements.

c. Types of fire trucks:

- (1) Squad truck.
- (2) Triple combination truck.
- (3) Service truck.
- (4) Quadruple combination truck.
- (5) Aerial truck.
- (6) Special apparatus.

d. Fire trucks:

- (1) Fire-truck design.
- (2) General truck construction.

e. Truck engines:

- (1) Types of engines.
- (2) Fuel system.
- (3) Ignition system.
- (4) Cooling system.
- (5) Lubricating system.
- (6) Starting device.
- (7) Location of engine on chassis.

f. Fire pumps.

- (1) Types of fire pumps.
 - (a) Piston.
 - (b) Rotary.
 - (c) Centrifugal.

- (2) Location of pump on chassis.
- g.* Fire-pump accessories:
 - (1) Pulsator.
 - (2) Churn valve.
 - (3) Engine-speed governor.
 - (4) Priming devices.
 - (5) Indicating gages.
- h.* Power transmission:
 - (1) Clutch.
 - (2) Transmission.
 - (3) Differential.
 - (4) Drive.
 - (a) Chain.
 - (b) Worm.
 - (c) Universal joint.
 - (d) Pump drive.
- i.* Electrical system:
 - (1) Generator.
 - (2) Distributor.
 - (3) Current storage.
 - (4) Current consumption.
 - (5) Current control.
- j.* Pumper operation:
 - (1) Operating from draft.
 - (2) Connecting hose.
 - (3) Priming.
 - (4) Operation.
 - (5) Shutting down.
 - (6) Pumping from hydrant.
 - (7) Booster tank operation.
- k.* Operating troubles:
 - (1) Engine trouble and probable causes.
 - (2) Possible fuel troubles and their remedies.
 - (3) Possible ignition troubles and their remedies.
 - (4) Pump operation troubles and probable causes.
 - (5) Complete failure.
- l.* General care of apparatus:
 - (1) Keeping apparatus clean.
 - (2) Care of tires.
 - (3) Tire chains.
 - (4) Caring for battery.
 - (5) Radiator care.
 - (6) Caring for pump.
- m.* Testing:
 - (1) Pumper test.
 - (2) Road test.

III. PRACTICAL WORK.

a. Have each student connect pump to hydrant and discharge the proper stream with the correct pressure.

b. Have same done from draft.

IV. TEST. Repeat operations covered in practical work and grade students' performance.

V. SUMMARY.

a. Types of apparatus and their uses.

b. Importance of regular inspections and operating drills.

Subject No. 8. Ventilation

LESSON No. 1. Principles of ventilation.

OBJECTIVE. To develop an understanding of the principles of ventilation and its use in fire fighting.

EQUIPMENT AND TRAINING AIDS. Charts and pictures of ventilation practices; building plans.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit VII; TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of ventilation to personal safety, safety of others, and efficiency of fire fighting.

II. DISCUSSION.

a. Meaning of ventilation:

(1) General definition.

(2) Definition as applied to fire service.

b. Products of combustion: smoke, gases, and heat:

(1) What happens in closed building.

(2) Contributing factors.

c. Conditions before ventilation:

(1) Nature of smoke and gases accumulated.

(2) Operational hazards.

(a) Dense smoke.

(b) Lack of oxygen for breathing.

(c) Presence of carbon monoxide.

(d) Presence of nitrous fumes.

(3) Fire hazards; excessive temperature.

(4) Explosive hazards; back-draft.

d. Reasons for ventilation; to—

(1) Permit fire fighters to work in the building.

(2) Prevent further spread of fire.

(3) Extinguish the existing fire with the least amount of water possible.

(4) Prevent smoke damage.

e. Signs showing need for ventilation:

(1) Visible smoke.

(2) Heat.

f. Prevention requirements:

(1) Rescue work.

(2) Providing adequate protection.

(a) Charged hose lines.

(b) Personnel protection.

g. Responsibility of fire department; know—

(1) Construction and plan of building.

(2) Furnishings and equipment of building.

- (3) Special hazards of building.
- h. Types of ventilation:
 - (1) Cross ventilating.
 - (a) When necessary.
 - (b) Methods.
 - (c) Precautions.
 - (2) Vertical ventilation.
 - (a) When necessary.
 - (b) Methods.
 - (c) Precautions.
- i. Methods of ventilating:
 - (1) Windows.
 - (a) When necessary.
 - (b) How to open.
 - (c) Precautions.
 - (2) Doors.
 - (a) When necessary.
 - (b) How to open.
 - (3) Louvers.
 - (a) How to open.
 - (b) Precautions.
 - (4) Roof.
 - (a) When necessary.
 - (b) How to open.
 - (c) Where to open.
 - (d) Precautions.
 - (5) Basement.
 - (a) Where to open.
 - (b) How to remove smoke.
 - (6) Air-moving system; precautions.
 - (7) Checking results.

III. PRACTICAL WORK. Using charts and building plans, conduct a conference on methods of ventilating fires at different points.

IV. TEST. Take class into different buildings and assume there is a fire in different parts of the building. Have each student describe how he would ventilate, giving reasons for his method.

V. SUMMARY...

- a. Importance of knowing hazards of smoke and gases.
- b. Importance of knowing building, its contents, and special hazards.
- c. Possibility of either cross or vertical ventilation.
- d. Need for knowing where, when, and how to ventilate.

Subject No. 8. Ventilation

LESSON No. 2. Ventilation.

OBJECTIVE. To develop an understanding of the importance of fac-

tors involved in ventilation.

EQUIPMENT AND TRAINING AIDS. Charts on ventilation practices.

REFERENCES. Oklahoma A & M Fire Service Training Manual, Unit VII, TM 5-692.

TIME REQUIRED. Two hours.

PRESENTATION.

I. INTRODUCTION. Importance of knowing correct ventilating procedure. Dangers of incorrect ventilation.

II. DISCUSSION.

a. Factors affecting ventilation procedure:

- (1) Construction of building.
- (2) Occupancy.
- (3) Extent of fire.

(a) Burning freely.

1. Atmospheric conditions such as temperature and direction and velocity of wind.
2. Exposures.
3. Private protection.
4. Water supply.
5. Rescue possibilities.
6. Fire-fighting procedure.

(b) Smoldering.

1. Material involved.
2. Smoke and gas travel.
3. Rescue possibilities.
4. Ventilation possibilities.
5. Fire-fighting procedure.

b. Sizing up situation:

- (1) Amount of smoke.
- (2) Heat.
- (3) Rescue requirements.
- (4) Construction of building.
- (5) Occupancy.
- (6) Location of fire.
- (7) Extent of fire.
- (8) Smoke and gas travel.
- (9) Fire travel.
- (10) Manpower and equipment available.
- (11) Exposures.
- (12) Self protection.

c. Determining ventilation procedures:

- (1) Rescue procedure.
- (2) Fire-fighting procedure.
- (3) Where to ventilate.

- (4) How to ventilate.
- (5) Where to enter.
- d. Precautions in rescue work:
 - (1) Entry point.
 - (2) How to enter.
 - (a) Pairs or squads.
 - (b) Use of life line.
 - (c) Use of gas mask.
 - (d) Protecting rescuers.
 - (3) Building construction.
- e. Precautions against fire spread:
 - (1) Prevention preparation.
 - (a) Charged lines.
 - (b) Assignment of personnel.
 - (c) Point of entry.
 - (2) Exposures.
 - (3) Stand-by lines.
- f. Precautions in opening building:
 - (1) Back-draft.
 - (2) Gases.
 - (3) Guarding against unnecessary damage.

III. PRACTICAL WORK. Prepare plans of buildings with an imaginary fire in each plan. Have men describe where and how to ventilate, with proper attention to rescue work and preventing fire spread. Hold class conference on each suggested plan.

IV. TEST. Using the same building plan, have each man explain why he entered at the point he designated and what precautions he had in mind.

V. SUMMARY.

- a. Need for inspection in order to be familiar with buildings.
- b. Importance of quick thinking and correct decisions.
- c. Rescue considerations.
- d. Precautions.

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